The Need for Non-combustible Construction in New Assisted Living Facilities

The Fire Safe Construction Advisory Council

October 14, 2008

Virginia's Aging Population

- 49% Increase by 2025 → 1.5 million older adults in Virginia (65+).
- Senior housing will have to grow to meet demand.
- Lack of definition for Assisted Living Facility.
- USFA & NFDC cite that this demographic is at the highest risk of dying in a fire.

An At-risk Population

- More than 1,000 older adults die each year in fires nationally[1].
- More than 2,000 older adults are injured each year in fires nationally[1].
- Between 2001-2004, 32.9% of fatal injuries in older adults were the result of a physical disability[2].

1. USFA/NFDC
2. NFIRS 5.0 data only

Reality vs. Regulatory

- No standard or clear definition for Assisted Living Facilities (ALFs).
- Most definitions include some level of assistance with activities of daily living.
- 2004 – DHHS found over 36,000 *licensed* facilities, but many are unlicensed.

Regulatory

- Virginia's USBC says ALF residents should be able to respond to an emergency *without* assistance from staff
- DSS makes no mention of ALF residents being capable of self-preservation in an emergency.
- Reality is very different from these definitions!

Reality

- 81% or more of ALF residents need assistance with one or more daily activities[1].
- DSS defines "assisted living care" as a level of service provided by an ALF for adults who may have physical or mental impairments and require at least moderate assistance with activities of daily living.
- 52% of ALF residents have a cognitive impairment of some type[2].

1. National Center for Assisted Living
2. AARP Public Policy Institute

Disconnect!

- The AARP reports that current national model fire codes do not take senior's needs into consideration.
- It is OBVIOUS that many seniors in ALFs WILL need staff assistance to evacuate in a fire emergency.
- This takes precious time, especially given physical impairments and/or confusion as a result of being awakened.

A solution?

- The Virginia Fire Safe Construction Advisory Council has proposed amending Virginia's 2008 USBC.
- I-1 buildings, which includes ALFs.
- Requires use of non-combustible materials in construction.

Specific Requirements

- Buildings 1 to 3 stories in height will require non-combustible materials with a fire resistance rating of not less than 1 hour.
- Buildings over 3 stories will require non-combustible structural elements capable of withstanding a fire for 2 hours.

Protection with Balanced Design

- These proposed changes incorporate the Balanced Design approach to fire protection.
- The changes will result in the same level of fire protection provided for nursing home residents and hospital patients.

What is Balanced Design?

- Balanced design is the use of 3 components:
  1. **Containment** (*passive*) – structural elements of non-combustible construction that provide 2-4 hours of fire protection
  2. **Detection** (*active*) – smoke detectors
  3. **Suppression** (*active*) – using sprinklers which are designed to control fires only until emergency responders arrive
- Each component works differently to protect.

Code History

- Original intention in code was to protect property, not the lives of occupants or firefighters.
- Sprinkler suppression systems are designed only to suppress fire long enough for residents to evacuate.

Benefits of NC³

- By preventing fire from spreading, NC³ materials significantly reduce:
  - Injury
  - Death
  - Property damage
  - Rebuilding Costs
- The probability of a fire spreading from its point of origin **decreases exponentially** in relation to the increased use of NC³ materials (USFA).
- NC³ materials often do not need replacement after a fire.

The Ability to Save More Lives

	Predominate Type of Construction	
	Combustible (≤ 4 stories)	Rated Noncombustible (≥ 5 stories)
Deaths per 100 fires	0.68	0.42
Average property loss per fire	$26,316	$9,167

Source: NFPA report titled *Non-Confined Reported Fires in Apartments (Including Row Houses and Townhouses) Excluding Buildings under Construction*
Years: 2002 – 2005
Sprinklers present

- The death rate in the shorter buildings is 62% greater than in the taller buildings.
- Evacuation is more difficult, more people are at risk, and fires are more difficult to fight in taller buildings, but they are built with fire-resistive non-combustible construction.

NC³ = Green

- Long life span
- Energy Efficiency
- Durability
- Recycled content
- Locally produced
- Low construction waste

Firefighter Protection

- NC³ protects firefighters by maintaining structural integrity.
- Non-combustible masonry/concrete does not produce smoke or generate toxic fumes.
- Allows firefighters to focus on extinguishing a blaze rather than containing it.
- NC³ construction keeps fires from spreading, protecting neighboring properties as well.

Cost Effectiveness

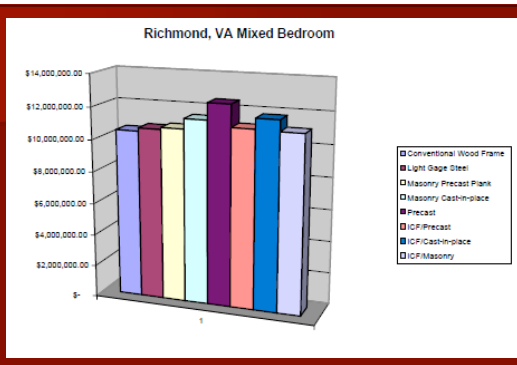
- Misconception that using NC³ materials significantly increases costs.
- A study was performed comparing the relative construction costs of different building materials including:
  - Wood
  - Light Gage Steel
  - Masonry and Precast concrete in combination
  - Precast concrete
  - Insulating concrete forms (ICF)
  - Precast plank concrete
  - Concrete masonry units (CMU)

HAAS Study

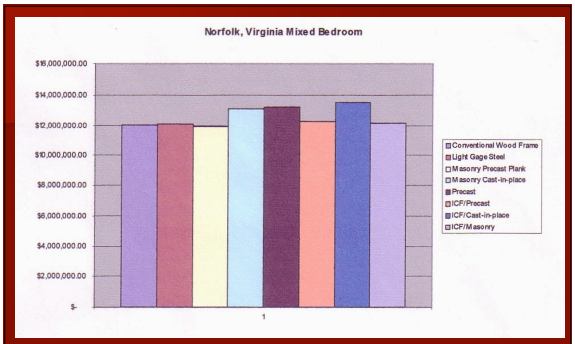
- The study uses an IBC compliant multi-family building designed by HAAS Architects of State College, PA.
- Model building is representative of typical multi-level, apartment-style senior marketed housing.
- The building design was checked for code compliance by a second independent firm.
- Construction cost estimates prepared by Poole Anderson Construction using prevailing labor wage rates in a variety of locales including Washington, DC, Richmond, Norfolk, and Roanoke.

Conclusions

- Constructions costs of using NC[3] materials versus traditional material is comparable – ranging from -3% to 5% depending on locale and product mix.
- Any increased amount is less than the typical contingency budget for unanticipated costs.
- Any minimal costs difference can be made up during the life of the building.



HAAS Study



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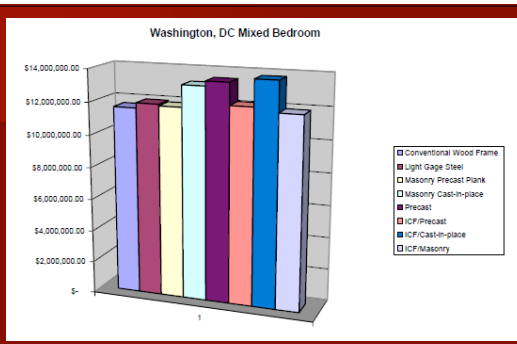

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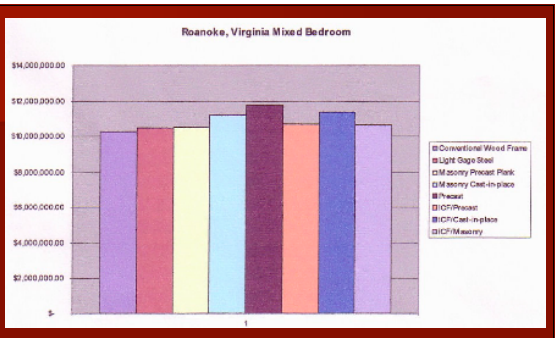

HAAS Study

Cost Summary

Building System	Richmond	Norfolk	Roanoke	Washington, DC
Conventional Wood Framing	$11,630,953 100%	$10,505,254 100%	$12,000,124 100%	$10,283,341 100%
Light gage Steel	$11,943,109 103%	$10,707,414 102%	$12,065,128 101%	$10,489,686 102%
Masonry & Precast	$11,848,205 102%	$10,827,256 103%	$11,898,398 99%	$10,541,232 103%
Precast	$13,485,270 116%	$12,500,179 119%	$13,243,738 110%	$11,775,080 115%
ICF walls & Precast plank	$12,140,136 102%	$11,123,062 106%	$12,269,946 102%	$10,670,734 104%

Cost savings of NC^3 Construction

- Building life cycle costs will be reduced through:
  - Lower insurance costs
  - Higher energy efficiency
  - Mold Resistance
  - Resistance to damage from vandalism
  - Minimal damage caused by fire and water in the event of a fire in the building

Insurance Savings

- Sample annual premium quotes for a 2500 ft^2, $350,000 building:
  - Frame: $2420
  - Joisted masonry: $1922
  - Non-combustible: $1605
  - Masonry non-combustible: $1432
  - Modified or non-modified fire resistive: $981

National Code/ICC

- **The IBC is a minimum code.**
- Many states have modified major elements to code requirements.
- Older, legacy codes were much more stringent, affording much greater protection.

Act Now

- The aging population is already at risk. They cannot protect themselves in the face of a fire.
- The US Fire Administration reports that older adults are **2.5 times more likely to die** in fires than the overall population.
- The facilities that house them are being built now. Waiting 3, 6, or 9 years will continue to put more of our population at risk.

Link to Video

Endorsed by:

- AARP
- Virginia Fire Services Board Code Subcommittee: